

REMARKS

Prior to entry of this Amendment, claims 1, 2, 4, 5, 8-12, 14, 15 and 18-26 are currently pending in the subject application.

By this Amendment, claims 1, 11 and 21 are amended. No new matter is added. Claims 1 and 11 are independent.

Applicants request, in the next Office action, that the Examiner indicate the acceptability of the drawings filed on December 31, 2003.

A. Introduction

In the outstanding Office Action Made Final, the Examiner rejected claims 1-2, 4, 11-12, 14 and 23-26 under 35 U.S.C. § 103(a) as being unpatentable over WO 00/00993 to Chen et al. ("the Chen et al. reference"); rejected claims 5 and 15 under 35 U.S.C. § 103(a) as being unpatentable over the Chen et al. reference, and further in view of applicants' admitted prior art ("AAPA"); and rejected claims 8-10 and 18-22 under 35 U.S.C. § 103(a) as being unpatentable over the Chen et al. reference, and further in view of U.S. Patent No. 5,560,776 to Sugai et al. ("the Sugai et al. reference") and U.S. Patent No. 5,531,834 to Ishizuka et al. ("the Ishizuka et al. reference").

B. Asserted Obviousness Rejection of Claims 1-2, 4, 11-12, 14 and 23-26

In the outstanding Office Action Made Final, the Examiner rejected claims 1-2, 4, 11-12, 14 and 23-26 under 35 U.S.C. § 103(a) as being unpatentable over the Chen et al. reference. The rejection is respectfully traversed for at least the following reasons.

Applicants submit that the Chen et al. reference fails to disclose or suggest, *inter alia*, "a single coil having a plurality of turns including an outermost turn and a plurality of inner turns," as now recited in claim 1.

In contrast, the Chen et al. reference discloses that *all* embodiments (*see* FIGS. 3-7) having two or more spiral coils (i.e., coil 1 and coil 2) positioned on a dielectric window of a plasma chamber (*see* page 4, lines 6-7 in the Chen et al. reference). Thus, the antenna of the Chen et al. reference cannot be a single coil system.

Further, each coil (coil 1 and coil 2) of the Chen et al. reference fails to disclose or suggest a “plurality of inner turns.” That is, the Chen et al. reference teaches only *one* inner turn and one outermost turn (*see* FIGS. 3-7). As such, the length of the inner turn in the Chen et al. reference is shorter than the length of the outermost turn.

Further, because the Chen et al. reference teaches one inner turn, the Chen et al. reference also fails to disclose or suggest, “a sum of lengths of the plurality of inner turns is longer than a length of the outermost turn,” as recited in claim 1.

For at least these reasons, Applicants respectfully submit that claim 1 is allowable over the Chen et al. reference. Therefore, Applicants respectfully request favorable reconsideration and withdrawal of the rejection of independent claim 1 under 35 U.S.C. § 103(a) based on the Chen et al. reference.

Independent claim 11 is also allowable as claim 11 includes similar subject matter found in claim 1. In particular, claim 11 recites “an antenna having a single coil system.”

Claims 2, 4, 12, 14 and 23-26 depend from either independent claim 1 or 11. Hence, claims 2, 4, 12, 14 and 23-26 are at least allowable as depending from independent claim 1 or 11, which includes allowable subject matter that is neither taught nor suggested in the applied reference. Accordingly, Applicants respectfully request favorable reconsideration and withdrawal of the rejection of claims 1, 2, 4, 11, 12, 14 and 23-26 under 35 U.S.C. § 103(a) based on the Chen et al. reference.

C. Asserted Obviousness Rejection of Claims 5 and 15

In the outstanding Office Action Made Final, the Examiner rejected claims 5 and 15 under 35 U.S.C. § 103(a) as being unpatentable over the Chen et al., and further in view of the AAPA.¹ The rejection is respectfully traversed for at least the following reasons.

The Examiner admits that “Chen et al. is applied as above but does not expressly disclose wherein the plurality of turns is formed of a single conductive line.”² Yet, the Examiner attempts to overcome the noted deficiency of the Chen et al. reference by arguing that AAPA teaches the plurality of turns formed of a single conductive line. However, Applicants submit that AAPA is a completely different, opposite structure than the claimed invention. Specifically, when a conventional inductively coupled antenna is used, the density distribution of the plasma will not be uniform in the reaction chamber because the strength of the electric field that is induced by the antenna may vary with location, e.g., the induced electric field is strong at a center portion of the antenna and weak at an edge portion of the antenna, which provides a lower plasma density at the edge portion of the reaction chamber. Accordingly, when the density distribution of the plasma is nonuniform, the depth to which the wafer W is etched (or the thickness to which the material layer is deposited on the wafer W) will be nonuniform.

Further, the structure of the background art shown in FIG. 1 and 2 of AAPA, is just that, a conventional ICP processing apparatus. Therefore, the Examiner is improperly using the actual teachings and observations described in the instant specification against the claims. Applicants do acknowledge that some hindsight reconstruction of the prior art may be found so as to be acceptable for examination purposes (e.g., determining scope of prior art search, related field of endeavor, etc.). However, the problems that have been identified and solved by Applicants, were

¹ Applicants have not made any admissions regarding the status of the prior art within the section of the instant specification titled “Background of the Invention.”

² See Final Made Office Action mailed July 25, 2007, paragraph bridging pages 3 and 4.

accomplished *only* by Applicants through their own analysis and experimentation (supported in numerous parts of the specification, specifically, *see* paragraphs [0007] – [0010]). Accordingly, it is the Applicants, not the prior art of record, that have identified the problems associated with the claimed inductively coupled antenna (e.g., conventional antennas cannot ensure a uniform distribution of plasma in response to changes in process conditions). Absent a showing by the Examiner that there are recognized problems associated with the prior art of record (or within one of ordinary skill in the art's routine skill), than the Examiner is simply using Applicants' own specification as a roadmap to reconstruct the claimed invention. It is respectfully submitted that this is improper.

Even assuming *arguendo* that the Chen et al. reference and AAPA are combinable, in which Applicants do not agree or admit to, Applicants submit the Examiner has failed to provide any evidence of motivation why the coils of AAPA should be used in the antenna of the Chen et al. reference, or more specifically, evidence as to why one of ordinary skill in the art would be motivated to have a sum of lengths of a plurality of inner turns be longer than a length of the outermost turn when the Chen et al. reference uses tuning capacitors to adjust the current in the outer coil so as to be larger than the inner coil. Further, the Chen et al. reference teaches that while the inner coil typically has a shorter electrical length than the outer coil, a greater degree of current adjustment may be realized when the electrical length of the coils are substantially similar. Accordingly, Applicants submit that the Examiner has failed to provide a proper *prima facie* case of obviousness under 35 U.S.C. §103.

Thus, for at least the reasons discussed above, Applicants submit that the combination of the Caro reference and the Dähne et al. reference fails to disclose or suggest all the features of

claims 3-8 and 14-17. Accordingly, Applicants respectfully request that the rejection be withdrawn.

D. Asserted Obviousness Rejection of Claims 8-10 and 18-22

In the outstanding Office Action Made Final, the Examiner rejected claims 8-10 and 18-22 under 35 U.S.C. § 103(a) as being unpatentable over the Chen et al. reference as applied to claims 1-2, 4, 11-12 and 14, and further in view of the Sugai et al. reference and the Ishizuka et al. reference.

As discussed above, Applicants submit that the Chen et al. reference and the Sugai et al. reference fail to disclose or suggest all the features of claims 1 or 11, from which claims 8-10 and 18-22 directly depend. Applicants submit that the Ishizuka et al. reference fails to overcome the deficiencies of the Chen et al. reference and the Sugai et al. reference, as applied to claims 1 or 11. Thus, for at least the reasons discussed above, Applicants submit that the combination of the Chen et al. reference, the Sugai et al. reference and the Ishizuka et al. reference fails to disclose or suggest all the features of claims 8-10 and 18-22. Accordingly, Applicants respectfully request that the rejection be withdrawn.

E. Entry of Amendment Requested

Applicants respectfully submit that the pending claims are in condition for allowance, and that the instant amendments overcome the rejections set forth in the outstanding Office action. Accordingly, it is respectfully submitted that consideration of the instant amendment does not place an undue burden on the Examiner, and entry of the above amendment after final is respectfully requested.

F. Request for Interview

In the event that a personal interview has not been conducted prior to the Examiner's consideration of this amendment, Applicants respectfully request that the Examiner contact Applicants' undersigned representative and schedule a personal interview.

G. Conclusion

The above remarks demonstrate the failings of the Examiner's arguments with respect to the outstanding rejection, and are sufficient to overcome the rejections. However, these remarks are not intended to, nor need they, comprehensively address each and every reason for the patentability of the claimed subject matter over the applied prior art. Accordingly, Applicants *do not* contend that the claims are patentable solely on the basis of the particular claim elements discussed above.

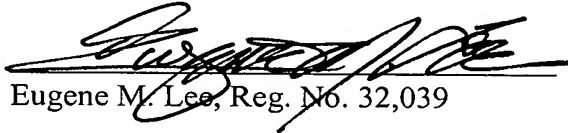
If the Examiner believes that additional discussions or information might advance the prosecution of the instant application, the Examiner is invited to contact the undersigned at the telephone number listed below to expedite resolution of any outstanding issues.

In view of the foregoing amendments and remarks, reconsideration of this application is earnestly solicited, and an early and favorable further action upon all the claims is hereby requested.

Respectfully submitted,

LEE & MORSE, P.C.

Date: PROPOSED


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PETITION and
DEPOSIT ACCOUNT CHARGE AUTHORIZATION

This document and any concurrently filed papers are believed to be timely. Should any extension of the term be required, applicant hereby petitions the Director for such extension and requests that any applicable petition fee be charged to Deposit Account No. 50-1645.

If fee payment is enclosed, this amount is believed to be correct. However, the Director is hereby authorized to charge any deficiency or credit any overpayment to Deposit Account No. 50-1645.

Any additional fee(s) necessary to effect the proper and timely filing of the accompanying-papers may also be charged to Deposit Account No. 50-1645.